



US006172798B1

(12) **United States Patent**
Albert et al.

(10) **Patent No.:** **US 6,172,798 B1**
(45) **Date of Patent:** **Jan. 9, 2001**

(54) **SHUTTER MODE MICROENCAPSULATED
ELECTROPHORETIC DISPLAY**

(75) Inventors: **Jonathan D. Albert; Barrett
Comiskey**, both of Cambridge, MA
(US)

(73) Assignee: **E Ink Corporation**, Cambridge, MA
(US)

(*) Notice: Under 35 U.S.C. 154(b), the term of this
patent shall be extended for 0 days.

(21) Appl. No.: **09/571,631**

(22) Filed: **May 15, 2000**

Related U.S. Application Data

(63) Continuation of application No. 09/300,585, filed on Apr.
27, 1999

(60) Provisional application No. 60/083,252, filed on Apr. 27,
1998.

(51) **Int. Cl.**⁷ **G02B 26/00**; G09G 3/34;
B29C 39/10; G03G 17/04

(52) **U.S. Cl.** **359/296**; 345/107; 264/4;
430/32

(58) **Field of Search** 359/263, 277,
359/296; 345/107; 349/86; 264/4; 430/32,
34, 35

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,961,804 * 10/1999 Jacobson et al. 204/606

6,017,584 * 1/2000 Albert et al. 427/213.3

FOREIGN PATENT DOCUMENTS

WO

99/56171A1 * 11/1999 (WO) G02F/1/167

* cited by examiner

Primary Examiner—Georgia Epps

Assistant Examiner—David N. Spector

(74) *Attorney, Agent, or Firm*—Testa, Hurwitz & Thibault,
LLP

(57) **ABSTRACT**

An electrophoretic display element includes a capsule hav-
ing a first, larger surface and a second, smaller surface. The
capsule contains a suspending fluid and at least one particle
dispersed within said suspending fluid. Application of a first
electrical field causes the particle or particles to migrate
towards the first, larger surface of the capsule, causing it to
take on the visual appearance of the particles. Application of
a second electrical field causes the particle or particles to
migrate towards the second, smaller surface, allowing the
capsule to take on the visual appearance of the dispersing
fluid or of a substrate or electrode positioned behind the
display element. Displays may be fabricated from multiple
display elements arranged on a substrate.

7 Claims, 9 Drawing Sheets

